

CHAPTER III

Construction

Even before passage of the law establishing a separate Corps of Topographical Engineers, the topogs were involved in construction as well as surveying and mapping. Colonel Abert, ever alert for ways to expand the influence and mission of the topogs, as early as 1831 insisted that his bureau should build all civil works. The topogs, he argued, were best suited to do so because they did the surveying, plans, and estimates. The Topographical Bureau began to undertake lighthouse construction in 1834 at the order of Secretary of War Lewis Cass. By 1838 the bureau's construction activities, which included lighthouses and beacon lights, monuments, and even bridges and aqueducts, actually surpassed surveying in importance.

In securing a construction mission for the topogs, Abert exploited the disinterest shown by the Corps of Engineers and its new chief, Colonel Totten, who replaced Gratiot at the end of 1838 and retained the office for 26 years. Abert claimed that "several of the distinguished officers of the corps of engineers," including Totten, "always viewed the superintendence of these civil works as an embarrassment to the proper functions of their own corps, and foreign to them; and with a just and enlightened consistency, always befriended those propositions before Congress, the tendency of which was to remove the obstacles before referred to, in the way of a proper arrangement of duties." As accurate as this assessment may have been, Totten still resisted turning over the more important of the 70 works under his charge in 1838. These included the Cumberland Road; piers at St. Louis; the lighthouse near Sandy Hook; and improvements on the Arkansas, Hudson, Mississippi, Missouri, and Ohio rivers. The law had assigned these projects to the Engineers, and a law was required to transfer them elsewhere. Secretary of War John C. Spencer finally forced Totten to relent in 1841, and the topogs monopolized federal civil works into the 1850s.

The Corps of Topographical Engineers undertook much of

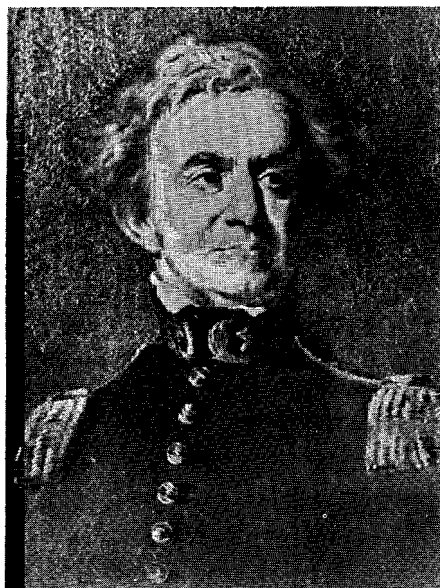
this construction for the Treasury Department. In addition to its traditional responsibilities of minting coins and issuing paper money, the department oversaw the operations of the Coast Survey and of the Customs, Lighthouse, and Marine Hospital services. Overburdened by the size of these varied operations, secretaries of the treasury turned to the topogs for construction services. The Treasury Department asked that officers be detailed for service on these various projects. Abert objected to details; he considered them a serious drain on his manpower and always preferred to take on a duty or mission rather than detail his men elsewhere to work for someone else. Any job, he claimed, “would be better done, in less time, more economically, and with fewer discontents, as the officer would be kept under his accustomed discipline and laws and regulations.”

Lighthouses

Topog involvement with lighthouse construction dated from 1834. That year, Captain Hartman Bache did the survey for the Brandywine Shoal Lighthouse in Delaware Bay. However, this precedent did not expand into a major mission. It nearly did so in 1842, when a House committee considered transferring the Lighthouse Service to the Topographical Bureau. Nevertheless, not until 1847 did Congress assign six lighthouses to Abert's corps. These lights drew on the experience of Captains William H. Swift and George W. Hughes, who had studied lighthouses in Europe.

Construction of these “lights” proved a real burden to the topographers. Uncharacteristically, Abert was not enthusiastic about getting this job. He was not consulted before passage of the law that assigned him the task, which he considered a drain on his meager manpower. The mission, which spread the topogs up and down the East Coast from New England to Florida, and as far west as Michigan, did not come with additional resources. In the 1850s, as many as 9 of Abert's 35 officers were under orders to the Lighthouse Board.

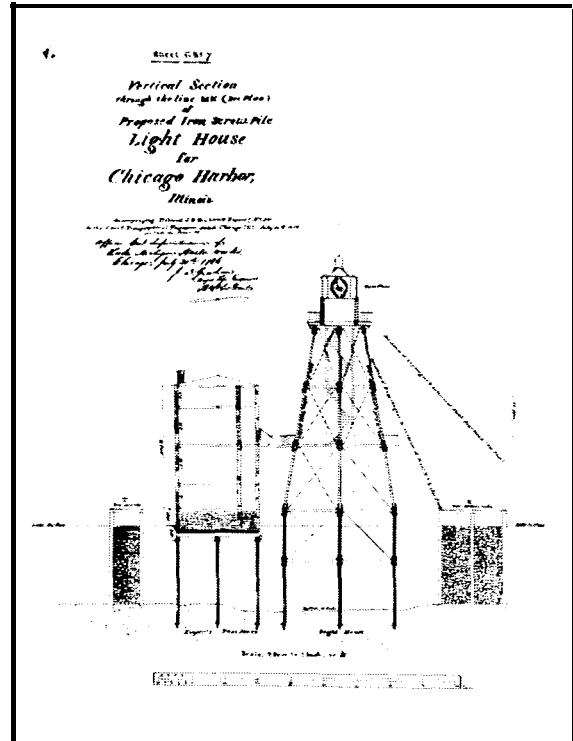
In 1851 Congress divided the responsibility for lighthouses between the topographers and the Coast Survey. The topogs were charged with preliminary surveys for lighthouses, lightboats, beacons, and buoys on the Great Lakes. The Coast Survey took on surveys for seaboard lights, with the Secretary of the Trea-



Joseph G. Totten (1788-1864) was Chief Engineer from 1838 to 1864. A specialist in coastal forts, he understood the impact of new naval technology, including steam vessels, on land defense. Totten was a regent of the Smithsonian Institution and helped organize the National Academy of Sciences. In civil engineering, he did important work on the composition of mortars and wrote *Hydraulic and Common Mortars*, published by the Franklin Institute of Philadelphia. A conservative, reserved man with a strong sense of duty Totten tended to do too much himself rather than delegate tasks to subordinates. Still, he found time to help younger officers and to pursue his interests in geology, mineralogy, and conchology.

surey overseeing the entire operation. A board was set up to examine the state of the nation's lighthouses. Lieutenant Colonel James Kearney, a senior officer of the Corps of Topographical Engineers, was one of the six members. The board recommended establishing a nine-member Lighthouse Board to administer the Lighthouse Service and the assignment of Army and Navy officers as inspectors to oversee construction, maintenance, and operations in each of the lighthouse districts.

In October 1852, Congress approved the planning board's recommendations and established "the Lighthouse Board of the United States." Its members included two senior naval officers, one Engineer, one Topographical Engineer, two civilians "of high scientific attainments;" and two secretaries. Lieutenant Colonel Kearney sat on the board until 1856, when Captain Andrew A. Humphreys replaced him. Bache succeeded Humphreys in 1862. More junior members of the corps, the first of whom was Lieutenant Edmund L. Hardcastle, served as one of the secretaries. The board divided the nation's coasts into 12 districts and instituted rules for operation of the lighthouse establishment. An officer assigned to each district as inspector disbursed funds and supervised the work of the lighthouse keepers; another officer appointed as engineer oversaw construction and maintenance. The law that set up the board assigned three specific



This diagram of a lighthouse for Chicago Harbor came from Major James D. Graham's 1854 report. The screw-pile lighthouse is an example of early iron truss technology. It was developed in England and imported by the Army topographers in the 1850s.

lighthouse operations to the topogs. These were evaluation of the plan for erecting a lighthouse on outer Minot Ledge in Boston Harbor; supervision of construction of a first-class lighthouse near Coffins' Patches, off Dry Bank, Florida; and construction of four beacon lights—two for Gedneys Channel, New Jersey, and two on Staten Island in New York Harbor.

Generally, when Topographical Engineers oversaw the construction of lighthouses, the Treasury Department transferred the responsibility to their corps. Before beginning construction, a topographer forwarded a survey of the site and a detailed report to Abert for approval. During construction, the topog submitted periodic progress reports and managed the entire project without the involvement of the Treasury Department. After completion of construction, including installation and testing of the light, the corps turned the lighthouse over to the Treasury Department.

Some officers, such as Hartman Bache, developed a keen interest in the work of the Lighthouse Service. He began work on the Brandywine Shoal Lighthouse in 1834 and in the 1850s was the 12th Lighthouse District inspector and engineer. While on the West Coast, he invented a fog signal based on a locomotive steam whistle. Air forced through a pipe by the rush of seawater made the whistle blow. Bache's signal worked until a very



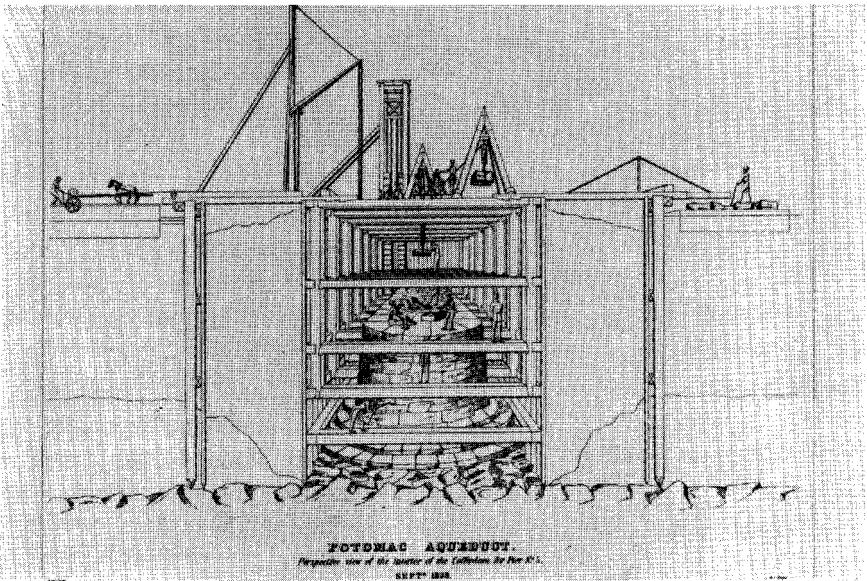
James Kearney was born in Ireland. He volunteered for service during the War of 1812, entered the Army as a third lieutenant of infantry, and served nearly 50 years. He rose to the rank of lieutenant colonel, second in seniority only to John Abert. This pen-and-ink portrait of Kearney was made by an unidentified lieutenant in about 1850.

powerful blast of air blew apart the support structure for the apparatus. Undaunted, he rebuilt the signal, added a safety valve, and got more than 12 years of use from the system.

Marine Hospitals

Topographical Engineers also oversaw the construction of marine hospitals. The Treasury Department administered the Marine Hospital Service, whose hospitals for sick and injured seamen were financed by deductions from their salaries. As inland shipping increased, marine hospitals became necessary along the rivers and Great Lakes as well as on the coast. Robert Mills, the Architect of Public Buildings, executed standard drawings for the inland marine hospitals in 1837 for sites already chosen by the Surgeon General. The Treasury Department asked Abert to detail officers to oversee the construction, using Mills' design. The topogs then would transfer completed structures to the Marine Hospital Service.

In 1845 Major Long was instructed to erect a marine hospital at Louisville, Kentucky. However, the Mexican War halted the project. After the war, Abert assigned Long three more hospital projects at Paducah, Kentucky; Natchez, Mississippi; and Napoleon, Arkansas. First Lieutenant Joseph Dana Webster also began work on a marine hospital at the former site of Fort

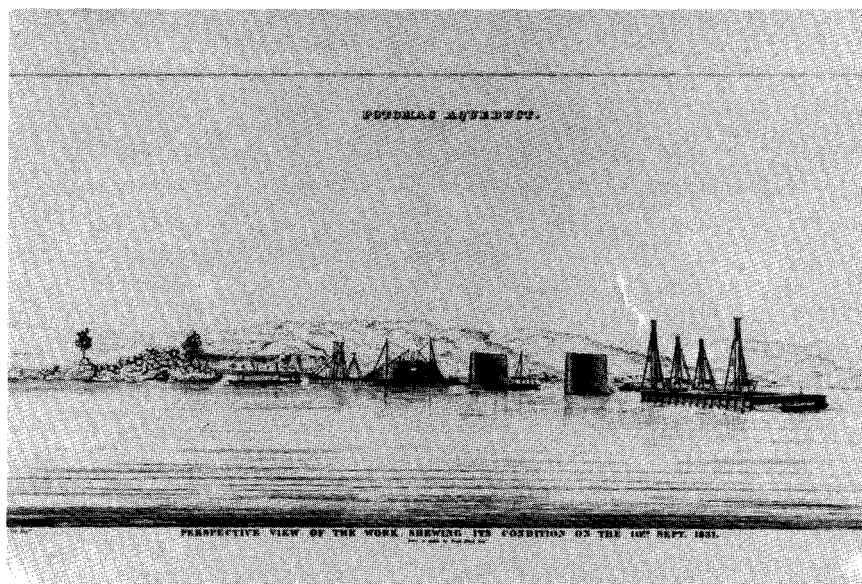


This illustration of the Potomac aqueduct under construction was done by civil engineer M.C. Ewing from a sketch drawn by Washington Hood during the period between Hood's resignation from the Army as an infantry officer and his joining the Corps of Topographical Engineers.

Dearborn, in Chicago. Both officers took on these duties in addition to other responsibilities. Heavy rains hampered Long's progress at Paducah in late 1849 and early 1850. At Napoleon, eroding riverbanks convinced him the hospital should be moved to Helena, but the Treasury Department insisted on the original site. The hospital opened its doors to seamen in 1855 but slid into the river 13 years later. In a few years, the town went the way of the hospital.

The New Orleans Customs House

One of Abert's officers also became involved in constructing a customs house. In 1848 the Secretary of the Treasury asked that Major William Turnbull, who had just returned from the Mexican War, oversee construction of the new customs house foundation in New Orleans. It was a small and singular type of job, and Abert did not insist on transfer of the work to his office. The Topographical Bureau detailed Turnbull to the Treasury Department, and he went to New Orleans in September 1848. Aware of the ground-water problems in the city, Turnbull studied other



One of the Washington aqueduct piers under construction inside a coffer dam.

foundations to ensure that his would support the new building. He disliked the assignment, complaining that Treasury Department personnel consistently disapproved his estimates, refused to pay his bills, and assigned him the “irksome” duty of “imbursements.” In late October 1849, after completing the foundation, Turnbull asked for relief. Abert granted his request in early December.

Washington, D. C.

Working with civilian engineers and the Corps of Engineers, the topogs helped change the District of Columbia from a village into a modern capital city. Specifically, the topogs built the first federal water supply in the District, conducted surveys, paved roads, and built bridges and public buildings. Their work in the city predated establishment of the Corps of Topographical Engineers and could even be said to have started before establishment of the Corps of Engineers. In 1791 Isaac Roberdeau, then a civilian, had worked with Major Pierre L'Enfant on the initial survey of Washington. He came back in 1822 as a Topographical Engineer and supervised construction of a conduit bringing a more reliable water supply to the White House.

Providing for the supply of water to the federal areas developing around the White House and the Capitol Building was a topog responsibility until 1852, when it passed to the Corps of Engineers. Fear of fire sporadically motivated Congress to provide funds for studies and construction of piping to locate and bring spring water to the two centers of the young federal government. In 1830 a civil engineer working for the topogs studied the city's springs, identifying the best sources of water. Two years later, Congress had the water piped to the Capitol and surrounding area.

Finally, in 1850, the legislators decided it was time to consider a water supply system for the entire city. Topog Captain George Hughes conducted that study, proposing to use Rock Creek inside the District boundaries to provide 12 to 22 million gallons per day. Congress did not act on his recommendation. Two years later, after a fire in the Capitol, the legislators again asked for a comprehensive inquiry. Colonel 'Ibtten convinced Congress to assign the work to the Corps of Engineers. Lieutenant Montgomery C. Meigs got the job and became superintendent of the construction that followed. From that time on, responsibility for the District's water supply passed from the 'Ibttopographical Engineers to 'Ibtten's organization.

The topogs also constructed bridges, a vital feature of any riverine city. William Turnbull, who was then a captain, managed the most important of these projects, the aqueduct over the Potomac River. A significant engineering achievement, the aqueduct allowed canal boats using the Chesapeake and Ohio Canal on the Maryland side of the Potomac to cross over to Virginia at Georgetown and carry their cargoes directly to the port of Alexandria, Virginia, without having to stop at the river. Between 1832 and 1843, Turnbull designed and built the quarter-mile-long wooden trough, supported by two stone abutments and eight masonry piers that extended a minimum of 36 feet under the water. Although much modified, this bridge was not replaced until completion of today's Francis Scott Key Bridge in 1923.

Working with the civilian architect Robert Mills, Captains Campbell Graham and Hughes helped plan a new War Department building. Andrew Humphreys, then a lieutenant, supervised construction of a bridge over Rock Creek, and later worked with architect William Strickland in designing a new hall for

the House of Representatives. Topogs also worked on other federal projects in the District, although some of their efforts never reached fruition. For example, in 1848 they carried out a major survey of Potomac River crossings that included estimates for the repair of the Long Bridge, construction of a bridge at the aqueduct in Georgetown, and maintenance of a steamboat ferry in lieu of a Potomac River bridge. After having asked for the survey, Congress provided no funds for construction. During the decade that followed, the topogs conducted at least two more surveys of the Potomac in the Washington area.

The Topographical Engineers also carried out a major improvement project on Pennsylvania Avenue. Captain Hughes started the job in 1845 with a plan and cost estimate. Hughes proposed a pebble pavement for carriages and wide brick sidewalks with a 20-foot gravel center strip dividing traffic on what Hughes called "this noble street." Because the level of the avenue made it "the general recipient of the drainage of the higher ground through the lateral streets," with water, sand, and mud pouring onto the road from the north, the plan also included the 15th Street storm sewer. Hughes did not get the chance to carry out the plan. After the start of war with Mexico, he was reassigned to forces operating in the enemy's northern provinces. Captain Graham carried out the project in two construction seasons, 1847 and 1849, contracting for materials but hiring his own workers. He then surveyed James Creek, a stream that carried both cargo and sewage from Capitol Hill to the Anacostia River, in 1851 to 1852.